



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

burned at sea; and three persons, *A*, *B*, *C*, whose respective veracities are  $\frac{3}{4}$ ,  $\frac{4}{5}$ , and  $\frac{5}{6}$ , report as follows: *A*, that the lost vessel was an iron steamer; *B*, that it was not a sailing vessel; and *C*, that it was a sailing vessel. Required the expectation of loss to the underwriter, the *a priori* probability of destruction by fire being twice as great in case of a steamer as of a sailing vessel."

SOLUTION BY HENRY HEATON, B. S., DES MOINES, IOWA.

Before receiving the testimony of either *A*, *B* or *C* the chances of burning of the different vessels were as 2, 2, and 1; after *A*'s testimony they were as 6, 2, and 1; after *B*'s, as 24, 8, and 1, and after *C*'s, as 24, 8, and 5, taking them in the order in which they are named in the problem.

Hence the chances of the burning of the different vessels are  $\frac{24}{37}$ ,  $\frac{8}{37}$  and  $\frac{5}{37}$ ; and the expectation of loss is  $\frac{24}{37}$  of \$20000 +  $\frac{8}{37}$  of \$15000 +  $\frac{5}{37}$  of \$10000 = \$17567.56 $\frac{2}{3}$ .

---

### PROBLEMS.

---

151. By A. W. MASON, CEDAR FALLS, IOWA.—What is the altitude of the maximum cylinder which can be inscribed in a given paraboloid?

152. By G. M. DAY, LOCKPORT, N. Y.—Find the surface of a right conoid with a circular base.

153. By J. B. MOTT, NEOS., Mo.—Prove that if  $(1+0\times\frac{1}{6}x\sqrt{-1})^{1+0}-(1-0\times\frac{1}{6}x\sqrt{-1})^{1+0}=\sqrt{-1} \dots (1)$ ,  $x=[(2\sqrt{-1})\div 0][(1+\sqrt{-1})^0-(1-\sqrt{-1})^0] \dots (2)$ ; and find the real approximate value of  $x$ .

154. By PROF. O. PRATT, SEN., SALT LAKE CITY, UTAH.—Find a general logarithmic theorem for the differentiation of

$$u=z^{x_1^{x_2^{x_3^{...^{x_n}}}}}, z, x_1, x_2, \text{ &c.}, \text{ being any functions of one variable as } x.$$

155. By PROF. C. BANCROFT, HIRAM, OHIO.—To find the least distance (in miles on the earth's surface) between two places given by latitude and longitude, taking into account the polar compression.

156. By PROF. JOHNSON.—In a determinant of the *n*th degree the elements of the principal diagonal consist of units, and of the remaining elements those in the first column are each equal to *a*, those in the second column each equal to *b* and so on. Evaluate the determinant.

157. By CHRISTINE LADD. — What is the entire number of double points which can be assumed arbitrarily on a curve of the  $n$ th degree?

158. By R. J. ADCOCK. — Let two concentric and similarly placed ellipses, infinitely near each other, be described, the semi-axes of the inner being  $a$  and  $b$ , and those of the outer  $a + da$ , and  $b + db$ ; show that the minimum distance between their perimeters  $= 2\sqrt{(ab)da \div (a+b)}$ .

159. By ARTEMAS MARTIN. — The first of two casks contains  $a$  gallons of wine and  $b$  gallons of water, and the second contains  $c$  gallons of wine and  $d$  gallons of water.  $e$  gallons are taken from the first and poured into the second cask, and then  $e$  gallons are taken from the second cask and poured into the first.

Required the quantity of wine in the second cask after  $n$  such operations as the one described above.

160. By PROF. A. HALL. —  $P$  and  $Q$  being functions of  $x$  find the conditions that the equation  $ydy + (P - Qy)dx = 0$ , is made integrable by the factor  $\frac{y}{[y + f(x)]^n}$ , and determine the form of  $f(x)$ .

161. By E. B. SEITZ. — Two equal circles, radii  $r$ , are drawn on the surface of a circle, radius  $2r$ ; find the average of the area common to the two circles.

---

QUERY, BY W. E. HEAL, WHEELING, INDIANA. — On page 149 of Chauvenet's Geometry it is stated, "That it is possible, by the use of the straight line and circle only, to construct regular polygons of 17 sides, of 257 sides, and in general of any number of sides which can be expressed by  $2^n+1$ ,  $n$  being an integer, provided that  $2^n+1$  is a prime number." How is this demonstrated?

---

### ERRATA.

On page 20, line 11, eq. (3), for  $(b^2 - a^2)$ , in denominator, read  $(b^4 - a^4)$ .

" 22, " 7, "  $aa + b\beta$ , " " "  $cy + b\beta$ .  
" " 15, "  $cy + a\gamma$ , " " "  $cy + aa$ .  
" " 15, "  $aa - b\gamma$ , " numerator "  $aa - b\beta$ .  
" 39, " 7 from bottom, for  $nr + n = t_n$ , read  $nr + m = t_n$ .  
" 51, " 3 & 4 from bottom, for  $d$  read  $d_1$ .  
" 52, " 1, for  $\delta = d_1^2 P(4)$ , read  $\delta^2 = d_1^2 P(4)$ .  
" " 7, " 140800000, in numerator, read 140800000 $\delta^2$ .  
" 53, " 7, "  $-(b^2 + 12d)^3$ , "  $-4(b^2 + 12d)^3$ .